

# CSE341 Theory Assignment 03

Total Marks - 15

---

1. Suppose you have an Intel 8086 which is operating at a Duty Cycle of 60% and for each clock pulse assume  $T_{off} = 60\text{ns}$ . The 8086 is now going to execute the instruction MOV [1235h], AX. Based on this, answer the following questions:

- Estimate the frequency at which the 8086 is operating from the clock pulse [1]
- Calculate the total time for one Instruction Cycle of the given instruction. [1]
- Calculate the values of the  $A_0$  and BHE' pins during the execution of the given instruction. [1]

2. Suppose an 8086 wants to read **2 bytes** of data from an **odd** memory location. Now the memory is working at a slower rate than the 8086. Hence when reading the 1st byte of data, the 8086 has to wait for an additional 3 clock pulses. But the 2nd byte was read without any delay. Now assuming the 8086 is working at a frequency of 5MHz calculate the following:

- The value of the Instruction Cycle (in nanoseconds). [2]
- The values of  $A_0$  and BHE' pins while transferring the 2 bytes of data. [1]
- The value of  $T_{ON}$  and  $T_{OFF}$  of each clock cycle and instruction cycle assuming the 8086 is running at a duty cycle of 60%. [1]
- Draw the timing diagram for the read cycle of the 1st byte showing the pins : the  $A_0 - A_{19}$ ,  $D_0 - D_{15}$ , ALE, M/IO, DT/R', and DEN', READY, RD' pin. [3]

3.

Addr.	D4h	D5h	D6h	D7h	751ECh	751EDh	221h	222h	223h	224h
Data	9Ch	A0h	15h	6Bh	89h	5Bh	12h	34h	11h	ABh

- Suppose for a different microprocessor, there are 512 interrupts. And in this system the size of the CS and IP is 24 bits each instead of 16 bits. Deduce the size of the Interrupt Vector Table (IVT) of the Intel 8086 if there are . [1]
- Considering we are working with a typical 8086 microprocessor (CS and IP are 2 bytes each), Calculate the interrupt vector(starting location) of the ISR corresponding to the interrupt caused by INT 53. [2]

4.

Address	00083h	00084h	00085h	00086h	00087h	1B5C0h	1B5C1h	1B5C2h
Data	9Ch	A0h	15h	02h	1Ah	5Bh	6Eh	78h

We want to find INT X. Here X is an integer value for which an ISR is called from the above IVT. The interrupt vector consists of the CS and IP values with which we can jump to the ISR starting. Here the high byte of the CS value is 1Ah. Find:

- Location where the CS and IP is located in the above IVT table. **[1]**
- Value of X. **[1]**